

They might also decide to invite several partner villages to join 721
 them and messengers would be sent out, running. The plan was
 always to fix a rendezvous somewhere near the boundaries of
 Papago country. This was generally at the base of the mountains
 to the east. "The Apaches never came down from the mountains
 except to raid. The mountains were their country. When they
 were escaping, they always ran straight up hill." (19) If the need
 were immediate, the meeting might be fixed for the next night. Other-
 wise the conventional interval was ten days. The messengers were
 given ten sticks to deliver. The Keeper at the partner village was
 to stand these up in the floor of the Big House and to lay one down
 each day. When they were all down, his war party started. The
 ritual speech made before the start has the title "Sticks Laid
 Down".

In the ten day interval the warriors exercised and prepared their 714
 equipment. They carried shield and club or bow and arrows as they 411
 chose. Specialisation in one or the other form of fighting was a
 permanent arrangement, only a few of the bravest using shield and
 club, which meant close-in fighting. Archers put a new string on
 the bow and carried another string in the quiver. They carried three
 hundred arrows, stone-tipped if possible, but a few wooden ones
 might be used to fill out the number. Every man took two pairs
 of sandals. Many wore headdresses in any form that suited them
 and these were repaired and made by the warrior himself.

When equipped, the warrior had his quiver slung over the right
 shoulder, so that it hung with the opening at the left, just at the
 waist. His bow he carried in his left hand and while fighting he
 would have several arrows in this hand also. His other baggage
 hung from the thong around his waist that held the breechclout.
 Even if he were not a club fighter, he might carry a club to finish
 the enemy. This was hung directly at the back. At the right he had
 a pouch, containing cornmeal which, mixed with water, would be
 his only food. In the same pouch might be a smaller one for tobacco
 and cornhusks or reed tubes for cigarettes. Another small pouch
 contained black and white paints. A half gourd, to serve as mixing
 bowl and drinking cup was slung from his belt by a thong. Some
 warriors distributed these various possessions in several pouches,
 elaborately made of fox or other animal skin with the fur on.

The warrior's hair was clabbed in a knot at the back of his neck. 714
 He wore one of several sorts of headdress or possibly none at all. 302
 His face according to some informants, was painted black from
 the start (9), and after killing an enemy, the lower part was white.
 According to others, it was not painted at all until he had killed

6: Densmore E-5 (1920)1929 NU28 Papago NU28

(unpublished)

PAPAGO MUSIC

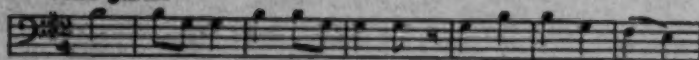
113

No. 71. "The Sunrises"

(Catalogue No. 1075) 533^x

Recorded by KITATAN

Voice $\text{♩} = 128$



WORDS

First rendition

Tharaj	woceracima	hokithab	kakatho
Sun	rising	at the side	bows
yahajwa	wúwacima	hokithab	pár
at the side	lying	at the side	the
mawithár	mamata	vúpákumi	thigmo
lion	babies	pink	that is all

Second rendition

Maratha	yutuna	hokithab	pár	vapakú ^a
Moon	setting	at the side	the	canes
yahajwa	wúwacima	hokithab	kiruho	
at the side	lying	at the side	wild cat	
mamatu	yahajwara	cúúwaj	kajima	
babies	moving around	uncertainly	that is all	

FREE TRANSLATION

The sun is rising,
At either side a bow is lying,
Beside the bows are lion-babies,
The sky is pink,
That is all.

The moon is setting,
At either side are bamboos for arrow-making,
Beside the bamboos are wild-cat babies,
They walk uncertainly,
That is all.

Analysis.—This song has a compass of 10 tones, beginning on the highest tone of the compass and having the lowest tone near the close of the song. The major third is the only interval occurring

^a This refers to pieces of cane used for the shafts of arrows.

231 good condition; the young men were not particularly accommodating, as their interest seemed to be centred in the corral, where they were breaking in horses, separating cattle, etc. These natives had little to sell me beyond 235 a fine basket used for harvesting sahuaro fruit. This kind of basket, which now is becoming rare, is of large [482] size, water-tight, and is carried on the head. Its decorative [532] designs sometimes represent the sahuaro cactus.

204 I visited Santiago, an old hunter, who, according to reports, used to be able to overtake deer, on the run, in half a day, and then shoot them with bow and arrow. In the hot weather these animals are not inclined to run long, as their feet become sore. Santiago is still very agile and quick in his movements and every day he goes out shooting quail, cotton-tails, jack-rabbits, and pigeons.

- 411 His bow, which I secured, is made from that beautiful greenish blue bush of the desert called *condalia*. It is strengthened by an ox-tail hide pulled over it. The bow string is made from the ligaments of the back of the neck of the same animal. Arrows are made from the *amole* (yucca) flower stalk, the point being of cat-claw, tied by deer sinew.

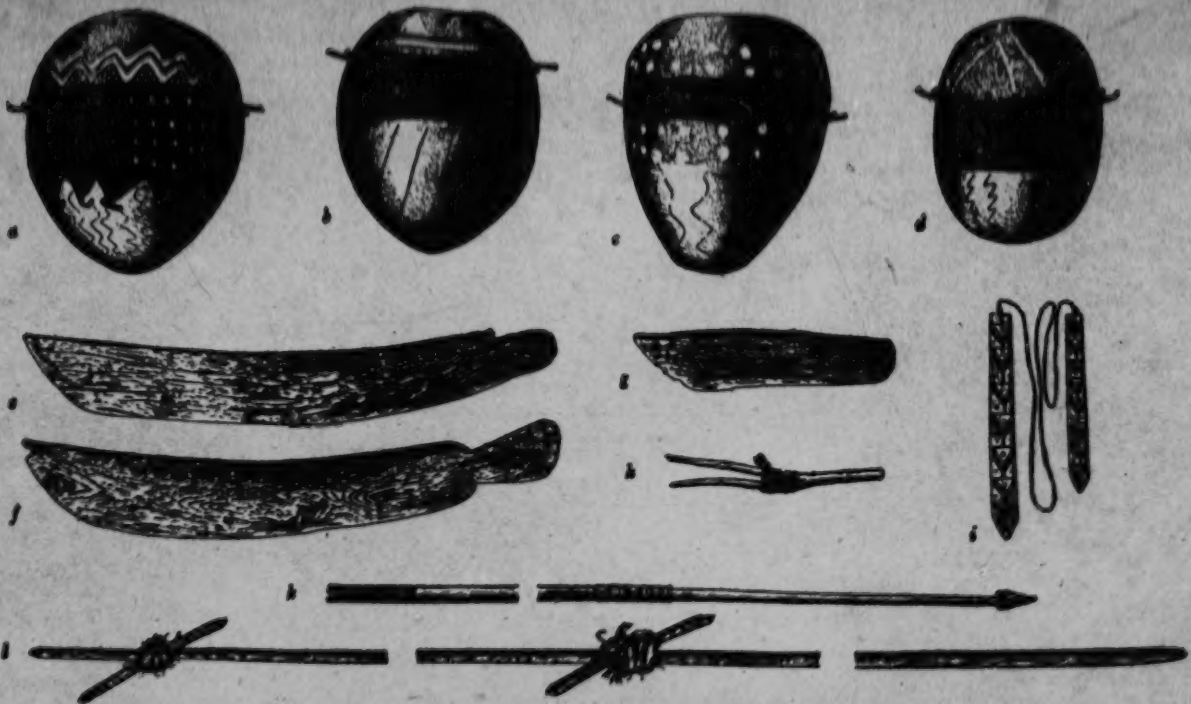
774 He was also willing to be photographed. He had been to Tucson and there had gone through the experience of the camera, so he had no objection but would expect some gratuity. I took three or four snapshots with my kodak, and he asked fifty cents, which I gave him, but he demanded fifty cents for each exposure, in which I could hardly humor him. The Papagoes all have a great disinclination to being photographed, and

133 until they widen out into the plains. For this reason the road, such as it is, from Fresnal southward makes a *détour* west.

778 At the well of Fresnal our horses, having been without water for twenty-two hours, each drank nine bucketfuls. The bucket was not large, but contained more than a gallon. A visit was made to the so-called Montezuma's Cave, once sacred to the Papago as the principal habitation with which tradition credits *Sihu*, also called *Ītoi*, the most important mythical personage of the Papago mythology, being their elder brother as well as creator of the world. The cave is called Elder Brother's House (in Papago, *Sihuki*; *ki*, house). It is situated at six miles' distance from Fresnal. We climbed nearly one thousand feet, and on the south side of a hill, below the peak, our guide, the medicine-man, pointed out the entrance to the sacred place, half hidden among bushes.

It was closed with a wall of loose stones and was so small that a man could only squeeze through with difficulty. The cave was found to be spacious and well formed. At one corner was deposited several hundred arrows, upright in a bunch, with nothing but the wooden part remaining. No flint points were visible. There is another cave on the east side of the Baboquivari Range, discovered lately by Mr. Jefferson Milton, where a considerable number of obsidian-tipped arrows were secured, one of which is reproduced at page 96.

• [41]
 ODD Though a few showers had fallen lately, still no grass had yet made its appearance and travel began to be difficult. The Indians had very little to sell in the way of



PAPAGO ETHNOLOGY

a (Santa Rosa, height, 29 cm.); b (Kivva); c (Anekam); d (Aktjin); Slender's masks. On the red (upper) section the zigzag mean clouds, on the white (lower) section the zigzag mean clouds and lightning; dots symbolize grains of corn. e, length, 77 cm.; f, length, 76 cm.; g, length, 41 cm.; Ancient wooden bows from Anekam, used by women. h, twig of greasewood, used for scratching oneself when on salt expeditions; length, 18.7 cm. i, bull-roarer; the triangles symbolize clouds; the lines (red) descending between the triangles indicate lightning, and the dots are corn, length of longest, 20.7 cm. j, old Papago arrow, with obsidian point, from cave in Baboquivari range, total length, 1 metre. k, stick for bringing down ahualo fruit; total length, 4 metres.

534
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 411 ●
 412
 222
 532.

[Facing p. 96]

783 Next morning I had an appointment with the Keeper
of the Smoke. Some days before he had promised to
411 make for me a shield of the same kind as the Papagoes
until quite recently were in the habit of making when
going on the war-path against the Apaches. As this is
a solemn act, which entails much fasting and praying on
the part of the maker, and also as it would mean, accord-
ing to Indian notions, certain risks and observances on
my part, we had agreed on a meeting at which I should be
enlightened as to my duties and dangers in the matter.

Accompanied by Pablo I arrived at the medicine
lodge at the appointed hour, which was "a little after
the sun is over the horizon." We found the keeper sit-
ting under the jacal in front of the lodge and facing the
east. He was a stern, almost fanatical-looking Indian
who conscientiously observes all the rules and regulations
his religion imposes on him. There was no English or
Spanish about this man. "I do not do things from hear-
say," he began. "Every evening I make a fire east of
the jacal (in the winter it would be inside the lodge) and
tell the people what I know to be the truth. In this
house I tell the people what to do, and this is the place
where any undertaking should begin."

785 He spoke for nearly an hour. The shield he would
786 make alone, and the proper precautions would be taken,
787 but he wanted to be assured that I would not trifle with it,
and that I should help in its making by fasting. "People
have sold you clown's masks and singer's masks," he
continued; "that is very wrong, and should never have
been done. The merit of the feast passes away with

304 At Anekam most of the middle-aged women and some of the men had their faces tattooed. These facial markings are dark blue in color and not elaborate. Common to both sexes is a thick line under the eyes, passing the outer angle of the eye and continuing parallel to the mouth until it nearly reaches the hair. This is almost becoming, reminding one of the way actors darken the eyelids. Men have besides markings on the forehead, and women, on the chin, have waving parallel lines descending from each corner of the mouth. Tattooing has been discontinued; the marks used to be applied with thorns from the sahuaro, taken from the top of the plant, and the charcoal of greasewood. Its purpose is somewhat doubtful. For men the reasons given were to draw blood from the eye; for women, to avoid getting wrinkles early. Generally women were the operators. After having been tattooed, salt was not eaten for a month.

853 A curious case of a woman nursing her two children
862 of different ages came under my observation here. When seated, she had the younger lying on the ground in its primitive cradle with the large detachable shade, while the larger one, a boy of four or five years, was playing about. He would frequently run up to his mother and demand his rights which were never refused. Standing up with a large straw hat on his head he enjoyed the mother's milk usually reserved for children of more tender years. Sometimes children who are able to walk are kept in the cradle.

411 The wellnigh universal superstition relating to flint
24

A UNIVERSAL SUPERSTITION

111

- 411 arrow-heads is also found among the Papagoes, though
 221 one would think that sufficient time had not elapsed
 since the days when the natives themselves made such
 objects. Their very name is lightning stone (*vibom*),
 and one man who presented me with one assured me
 that he found it by searching the ground after light-
 ning had struck near his house. Sometimes, when
 lightning strikes a tree, the Indians will dig in the
 ground underneath for arrow-points. It should be noted
 in this connection that these Indians fear lightning, al-
 though they are not afraid of thunder. Bows and arrows
 [224] are still used in Anekam in hunting rabbits, quail, doves,
 etc.

- 361 Our next stop was made at Kukómalik, fourteen miles
 further north, a new rancharia which owes its existence
 to a fine well left by Americans who had to abandon
 an attempt at cattle-raising. At only nine miles'
 distance from there, in the north-west, is Kohatk; this is
 the first Pima rancharia, and the principal one of four
 rancharias or villages which are found in a small extent
 of country hardly thirty miles long, beginning immediately
 south of the Casa Grande station on the Southern Pacific
 Railroad. It may be termed the Kohatk country, being
 inhabited by the Kohatk people, who are Pimas that
 have, to some extent, retained their originality. They
 have, at least, been less affected by the white man than
 their confrères at the Sacaton Reservation, and may
 possibly for a few years offer a fair field to the student.
 136 The country traversed after leaving Anekam was singu-
 larly devoid of animal life. Not even a jack-rabbit
 second side to live here.

223

[411]

The weapons mentioned in this story⁴ were probably made from obsidian which still serves as material for the making of arrow-points for ceremonial use. The obsidian is worked with a bone.

178

181

My camp was on the small plain on which the medicine lodge is situated, near an unusually well-grown mezquite tree, the shade of which is enjoyed by participants in the feasts that are given. In the evening spent here I could hear talking from the medicine lodge, but the old man, Miguel, who is in charge, complained much of the indifference of his countrymen, the younger generation never coming any more to the counsel house. The Indians here, in fact, are much spoiled by Mexicans and mescal brandy, and present to-day little of interest to the investigator. The same remark applies to the Indians of Sonoita, though in a lesser degree. A few, just a few, of the Mexicans exploit the Indians for their own purposes. It happens even that they ingratiate themselves by giving good advice—good for their own pockets—charging the confiding Indian for the advice. On the other hand, it must be said that the Papagoes of Sonora are in general treated with much more consideration than in Arizona. The Mexicans look upon them more as their equals, and the result is that the so-called civilized Indian is noticeably more polite in his manners in Sonora than in Arizona.

776

The great annual harvest feast for which Quitovac is famous, and to which people congregate from all parts of the Papagueria, is still kept up. It is performed in the month of August on a stretch of level ground half a mile ¹/₄ [of the origin of the whiteness of a man. -Analyst]

NATURAL CONDITIONS

331

which the Indians knew how to gather all the year round, 184
though after May that part of the plant which is above 222
ground withers away. They had their season of chia and
used to come as far as Quitovaquita and Santo Domingo
to gather mezquite beans (called by the Mexicans *pechita*)
and eat sahuaro and pitahaya. Near all the tinajas are
seen round holes from six to ten inches deep, made into
the solid rock, in which these Indians pounded mezquite 252
beans. Their pestles are frequently found. The beans 412
of the palo fierro were toasted, ground, and consumed as
pinole. After the scanty winter rains the juicy plant of
the sand dunes, *anothera trichocalyx*, was boiled and eaten.

The clothing of these people was made from the skin 184
of mule-deer, antelope, or mountain-sheep. The hair was 261
first removed with a bone taken from the lower foreleg
of the animal, and the skin was smeared with the brains.
The root of the torote tree, crushed and left in water, fur-
nished necessary material for the tanning process. The 291
man wore shirt and breech cloth, the woman a short skirt.
They killed sea lions on the rocks by hitting them on
the nose, and from their skins sandals and straps were
cut. From the badger's hair they were able to plait 301
ribbons for the hair and make twine to be used for the 331
breech cloth. Women wore sandals, but no hair ribbons.
The skirt was kept up by strings of buckskin.

The burden basket was not used, but they made carry- 124
ing nets as well as pottery, material for which is abundant 265
on the coast. Baskets were manufactured from torote,
willow, and bulrushes. In order to make bows, these 184
Indians travelled as far as the Colorado River to get 411

184 willow as material. Arrows were made from the arrow-
411 bush. Arrow-points of hard stone have occasionally been
found in that country, but never stone axes.

184 They had foot-races and also practised the game of
[526] throwing with the end of a thin pole two short pieces of
wood which are linked together. (Page 89.) In the
184 winter time they lived at a higher elevation in the moun-
221 tains where they erected grass huts. Once a year a jour-
[437] ney was made to Yuma to barter with the Indians there,
and maize, tepari beans, and squashes were exchanged
for baskets and sea-shells. Remnants of these people are
184 living at Quitovaquia and the Growler Well, both places
361 in Arizona. A few families are said to live near the rail-
way station, Adonde, near Wellton, on the Southern Pacific
line.

[pp. 333 to 343 not processed]

ARCH ENEMIES OF THE PAPAGO

361

one aided by the magicians. Inure yourself to the cold 702 while yet a boy. Fight not at all with your comrades; preserve your strength for the combat with the Apaches; then, if brave, will come to you high honor. Be unselfish or you will not be welcome at the fire of the friendly; the selfish man is lonely and his untended fire dies. Keep your peace when a foolish man addresses the people. Join not in his imprudent counsellings. Above all, talk not foolishly yourself. Bathe in the cold water of the early morning, that you may be prepared for the purification ceremony after killing an enemy!"

When an Apache campaign was decided upon, there 721 was much preparation for the fray, and the feasts and ceremonies connected with the return of a victorious party were among the most elaborate, foot-races and gambling forming a part. If the Apaches killed some 721 of the Papagoes, the former were believed to take the clouds away, so the Papagoes had to go and kill some of them in order to bring the clouds back. Sometimes the Apaches would be discovered in a week, and sometimes a whole month would pass before the encounter. The provisions consisted of pinole; bows and arrows, lances and clubs were the weapons, and almost every one 721 of the party had a shield. The Apaches have been credited with a superstition about fighting at night, and 721 the Pimas at least are said to have used this disinclination to their advantage. On returning, those who had 727 killed Apaches had to stay away from their houses and 723 bathe early in the morning before sunrise four times at intervals of four days. One man was appointed to pro-

VISITA CRIMINY OF THE PAPAGO (CONT.)

All the dancers carried quivers of arrows, the quivers being made of canvas, painted red or left natural color, or of skins. At least one quiver was made of the entire skin of a kit fox. These quivers were fastened across the small of the back at an angle, open end up and to the dancer's right. Many quivers were fringed. 796
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411

Two or more men carried imitation powderhorns of cowhorn, in one case carried slung over the left shoulder and resting on the right hip, in the other, tied to the belt on the right side.

The dancers' arms and legs were bare, though a few men had shirt sleeves and Levi legs rolled up and showing beneath the tunic. Legs and arms were painted with what seemed to be white clay, decorated with groups of short vertical lines, done both in red paint and by scraping off the clay. 292
796
[302]

On the left wrist the dancers wore ornaments of skin, canvas, or of both. One wore the entire skin of a ringtailed cat wrapped around his wrist, the tail dangling. Other wrist decorations were made by wrapping the end of a long strip of material, two to four inches wide, once about the wrist, letting the end dangle a foot or more. These were often fringed, or had plumes tied to them, and were painted in colors. Many were red with white geometric patterns; one was yellow with diagonal green lines. [301]

Each dancer carried a wooden arrow, fletched with turkey feathers, the point carved out the wooden shaft, or carried a wooden wand or lance, in the left hand. These were red, with white banding. In the right hand most carried a bow made of grotesquely twisted wood. These bows ranged from two to two and one half feet long, and were also painted red with white banding. A few men carried wooden guns, one being made of a twin-saguaro rib, the butt representing the stock, and the ribs the barrels of a double barreled shotgun. One or two men carried cheap commercial popguns. Several men with guns carried arrows in their left hands, though others carried wands and used them as ramrods. 293
796

Legs were bare from knee down, and the dancers wore anklets of black leather or of black cloth on which were sewed one or more rows of cocoons, fastened by one end. One dancer's anklets were solidly covered with cocoons, as if he had strung them and wrapped the string spirally about his ankle. All dancers wore sandals, of leather soles tied on with thongs. In some cases cocoons were sewn to the ankle binding, on the outside. 292
796

The chorus was made up of both men and boys, and each member carried ceremonial objects in both hands. All but two were bare headed, and wore halves of gourds bound over their faces. These gourds were decorated with horizontal zones of color, consisting of a blue band one and one-half or two inches wide at eye level, a red zone, extending 796
292
531

SMALL GAME

262 Black-tailed jackrabbit, <i>ten'k ten:wi</i>	(<i>Lepus californicus</i>)
White-tailed jackrabbit, <i>s'ton ten:wi</i>	(<i>Lepus alleni</i>)
Cottontail rabbit, <i>to:pi</i>	(<i>Lepus arizonae</i>)
Packrat, <i>ko:son</i>	(<i>Neotoma albigula</i>)
Round-tailed ground squirrel <i>ci:ri'k</i>	(<i>Citellus tereticaudus</i>)
Merriam pocket mouse, <i>naka'kio</i>	(<i>Perognathus spinatus</i>)
Kangaroo rat, <i>takious</i>	(<i>Dipodops</i> sp.)
Gambel quail, <i>kakaiten</i>	(<i>Lophortyx gambelii</i>)
Mourning dove	(<i>Zenaidura macroura</i>)

224 The Papagos differed from their neighbors in that their procedure with these small animals was to shoot them with bow and arrow, rather than to trap or club them. For the purpose they used arrows of creosote bush wood (*Covillea glutinosa*) with a wooden tip hardened in the fire.

[261] The Papagos considered cottontail meat sweet and jackrabbit poor. However, jackrabbit was the one meat available at all seasons, though in spring the animals were so thin as to be almost useless.

Rabbit shooting was usually done by the boys. The one exception was the rabbit hunt held in recent times just before the drinking ceremony. For this there was a regular director who also functioned in games. The Papago hunt differed from the Pueblo practice in that no stick was used and women did not take part.

The hunt took place in spring. All the men and boys engaged formed a circle about two miles in diameter with a line of the best bowman at one point. These men remained stationary while the circle converged and drove the rabbits toward them. All the killing was done with bow and arrow.

Rats and squirrels were hunted systematically at their holes. The packrat, largest of the group, was a very common food, and as it builds its nest surrounded with thorny cholla joints (*Opuntia* sp.), the process was to scare it out. Ground squirrels were smaller and less desirable, while pocket mice were too small but were eaten in "the hungry time." The kangaroo rat was a last resource.

281 Thongs and loin cloths were cut from buckskin even before there were sewed garments. To mark a straight line for the cutting the worker blackened his bowstring with soot, laid it against the skin, then the cutting was done with a flake of flint. Sewing was first done on pouches and quivers, then on simple garments. The needle was an awl of very hard wood which had to be obtained from the Altar valley and was sharpened with a stone and its head hardened on the fire. The thread was a buckskin thong pulled out very thin, twisted tightly and wet in the mouth.

WEAPONS

41 At present bows are made of mulberry (*Morus microphylla*) or, in its absence, of box thorn (*Lycium fremontii*). A long new mulberry shoot about two inches thick and five feet long was cut in the rainy season; then the bark was removed and the protuberances rubbed down with a stone. The last quarter of the length at both ends was tapered to an inch in diameter by scraping with a stone, the ends being finished with a notch for the string and a bulbous projection beyond it.

The bow was bent by laying it in hot ashes, stones being placed on and around it so as to bend the ends up at a gradual angle. The central part must not be bent at all since this would weaken it. The ends were next tied in position with strong cord of agave fibers (not the bowstring) and the bow set aside to dry thoroughly. It might then be painted with a series of red diagonal crosses down the outside, or it might have wrappings of deer sinew at either side of the hand grip.

The bowstring was a two-ply cord of deer sinew which was soaked, split with the teeth and rolled on the thigh. This hard rough cord was made rather smooth by running it through a small perforation bored in a stick of sabuaro wood (*Carnegia gigantea*).

The Papagos usually made stone-tipped arrows for war and large game, but wooden-tipped ones for small

ETHNOBIOLOGICAL STUDIES

[71

game. The stone tip was set in a foreshaft of hardwood, ⁴¹¹ usually creosote bush (*Covillea glutinosa*), although wood of the desert broom (*Baccharis sarothroides*), or the soapberry or Chinaberry tree (*Sapindus drummondii*), might also be used. The twigs were cut green, peeled and straightened by hand or with a stone arrow straightener, then laid away to dry. On the day of the arrow making they were split at one end to receive the tip and dipped in boiling "gum," which must always be the secretion found on the white brittlebush (*Encelia farinosa*), since mesquite "gum" melts in the sun and creosote bush "gum" is too sticky and adheres when the arrow goes through the grass. The arrow point was inserted in the slit at the end of the twig and when the "gum" had cooled, tied with a wet sinew. For shaft material a piece of the flower stalk of the Spanish Bayonet (*Yucca elata*), which is very light when dried, was used. However they also used for this purpose a reed (probably *Phragmites communis*), which they picked along the streams of the Pima country when they went there to work or trade. A hole two inches deep for the insertion of the foreshaft was bored in the pithy center of the shaft with a stick of creosote bush (*Covillea glutinosa*) sharpened to a point and roughened for friction with a stone. The end of the foreshaft was pointed with a quartz scraper, the foreshaft pounded into the hole and deer sinew wrapped around the joint for the whole of its length. ²³⁷

The preferred feathers for war arrows were those of the eagle (*Aquila chrysaetos*) and of three genera of hawks. The buzzard (*Cathartes aura septentrionalis*), turkey (*Meleagris gallopavo mexicanus*) and crow (*Corvus brachyrhynchos hesperis*) were ineligible "as the buzzard is stupid and does not kill and the other two birds are timid." Chicken hawks (*Accipiter* sp.) were kept in cages and their tail feathers plucked. ⁴¹¹

The quill was reduced by cutting off the tip to about five inches in length, after which it was split and the inside cleaned with the thumbnail. It was then scraped bare for

237 half an inch at each end and laid in a slightly spiral direction on the shaft just behind the nock, and both bare ends of the quill were bound on with wet sinew. Either two or three feathers were used for war arrows.

441 Wooden-tipped arrows were made of wood of the creosote bush (*Covillea glutinosa*) or of the arrow bush (*Pluchea sericea*) and might be full length with the tip rubbed sharp on a stone and hardened in the fire; or they might have a shaft of reed or Spanish Bayonet (*Yucca elata*) for three quarters of their length. This made an exceedingly light arrow particularly desirable for birds.

441 Quivers are of comparatively recent invention. Some 445 were made from the skins of such animals as the mountain lion (*Felis oregonensis hipolestes*), wildcat (*Lynx ruffus*) or coyote (*Canis lestes*) with the hair left on, the skin not being softened but sewed up while fresh and allowed to dry hard. The legs and tail were cut off (excepting the coyote whose tail was left for decoration) and the skin sewed up in rough bag shape. The head, from which the skull was removed, was left on and stuffed with grass so it would dry into the proper shape. The hollow head served as a hood over the arrows.

All these skins made small quivers and were used in hunting. For war, large quivers were made of antelope hide (*Antilocapra americana*), and such hide was cut and sewed in the shape of a cylinder a foot in diameter. In some cases a fringe of dressed buckskin appeared down the vertical seam.

Particular individuals had their quivers made of dressed and softened hide, generally from the white-tailed deer (53) (*Odocoileus couesi*) or antelope. These might have a fringe down the seam and a painted design of some brave animal on the back, the design being outlined with the secretion from the white brittlebush (*Encelia farinosa*), then (53) smeared over with red clay. Sometimes a yellow paint made from Spanish Bayonet flowers (*Yucca elata*), ground to powder, was used. The quiver was slung by a strap two

ETHNOBIOLOGICAL STUDIES

[78

inches wide made of fox skin (*Vulpes fulvus*) with the hair ⁴¹¹415 left on to prevent chafing.

The Papagos at present say that certain of the bravest men fought with club and shield, and a club is mentioned for the "Pimas" in early Spanish accounts (10, 27). The club was of ironwood (*Olneya tesota*) about eighteen inches long, and informants say that it was merely a roughly shaped length of wood with a thong run through a perforation in the upper end so that it could be carried. The shield was a disk of leather sixteen inches in diameter made of cowhide or horsehide. Ownerless cows and horses have roamed the country ever since the coming of the first Spaniards, and the Papagos hunted these like deer.

The customary way of making the shield was to soak the hide in water, then cut out the disk and lay it on hot ashes to harden, stamping it into a slightly convex shape, two holes first being punched near the center about six inches apart. When dry a thong was laid along the outside of the shield, its two ends passing to the inside through these holes. On the inside was a short stick of wood with notched ends to which the thong ends were tied, forming a handle. When dry the shield was painted with mesquite ¹³³ "gum" (*Prosopis velutina*) prepared as for pots, or with red and white clay.

FIRE

Fire was made with the palm drill; the heart of a cactus rib (*Carnegia gigantea*) was held with the feet while the drill of creosote bush wood (*Covillea glutinosa*) or arrow bush (*Pluchea sericea*) was revolved between the palms. A little sawdust from dry sahuaro rib caught the spark which was transferred to a pile of dry grass and manure. 372

POTTERY, EATING AND DRINKING VESSELS

Although a few old pottery jars appear to have lines ³²³ in red ochre at present all decorations are in black. This ³⁹⁶ black is usually made from the secretion of the mesquite